CLAIMS

We claim:

1. A method for measuring the concentration of impurities in helium gas by ion mobility spectrometry analysis, comprising carrying out the analysis under one of the following conditions:

employing as a sample gas a helium-argon mixture formed of the helium whose concentration of impurities is to be analyzed and pure argon, this mixture containing 0.1 to 50% argon, and pure helium as a counterflow gas in a separation zone of the ion mobility spectrometer; or

employing as the sample gas the helium whose concentration of impurities is to be analyzed or a mixture of this helium with pure argon, this mixture containing 0.1 to 50% of argon, and pure argon as the counterflow gas in the separation zone of the ion mobility spectrometer; or

employing as the sample gas a helium-argon mixture formed of the helium whose concentration of impurities is to be analyzed and pure argon, and as the counterflow gas a helium-argon mixture containing no impurities, wherein these mixtures have an argon concentration of 10 to 80%.

2. The method according to claim 1 wherein, when helium or a helium mixture is used as the sample gas and pure argon is used as the counterflow gas, the ratio of a flowrate of the counterflow gas to a flowrate of the sample gas is at least 10.

3. The method according to claim 2, wherein the ratio is 15 to 20.

4. The method according to claim 1 wherein, when two helium-argon mixtures are used as the sample gas and the counterflow gas, respectively, the two mixtures have an argon concentration of about 30 to 40%.

5. The method according to claim 1 wherein, when two helium-argon mixtures are used as the sample gas and the counterflow gas, respectively, the two mixtures have the same argon concentration.

6. The method according to claim 5, wherein the two mixtures are obtained by using a system (10) wherein a stream of helium containing impurities coming from a line (11) and a stream of pure argon coming from a line (12) are mixed in a line (13), checking the mixing ratio by flow rate control elements (C), subsequently dividing the so obtained gas mixture into two portions

conveyed into two secondary lines (13', 13"), conveying a first portion of the gas mixture in a first secondary line (13') without further treatment to a reaction zone (14) of the ion mobility spectrometer (15), conveying a second portion of the gas mixture in a second secondary line (13") to a purification system (16) which removes all impurities present in the second portion, and subsequently conveying the purified second portion as the counterflow gas to the separation zone (17) of the ion mobility spectrometer (15).

7. The method according to claim 6, wherein the purification system (16) comprises a purifier containing getter alloys based on zirconium or titanium.

8. The method according to claim 6, wherein the purification system (16) comprises a purifier based on nickel.

9. The method according to claim 8, wherein the purification system (16) further comprises a catalytic bed of palladium oxide.